Kalesnikoff Cross-Laminated Timber
Kalesnikoff Mass Timber Inc.

Issued October 28, 2020

Products: Kalesnikoff Cross-Laminated Timber
Kalesnikoff Mass Timber Inc., P.O. Box 3000, Hwy 3A, Thrums, British Columbia
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1. Basis of the product report:
   - 2018 and 2015 International Building Code (IBC): Section 2303.1.4 Structural glued cross-laminated timber
   - 2012 IBC: Section 104.11 Alternative materials
   - 2018 and 2015 International Residential Code (IRC): Sections R502.1.6, R602.1.6, and R802.1.6 Cross-laminated timber
   - 2012 IRC: Section R104.11 Alternative materials
   - APA Reports T2020P-35 and T2020P-40, and other qualification data

2. Product description:
   Kalesnikoff cross-laminated timber (CLT) is manufactured with spruce-pine-fir (SPF) lumber in accordance with ANSI/APA PRG 320 or proprietary layup combinations approved by APA through product qualification and/or mathematical models using principles of engineering mechanics. The laminating lumber shall have allowable reference design properties provided in Table 1. Kalesnikoff CLT can be used in floor, roof, and wall applications, and is manufactured with nominal widths up to 138 inches, thicknesses of 3.4 to 10.5 inches, and lengths up to 60 feet.

3. Design properties:
   Kalesnikoff CLT shall be designed with the allowable design properties and capacities provided in Table 2. The design value adjustment factors, such as load duration, creep, moisture, temperature, volume factors..., etc., shall be based on Table 10.3.1. of the 2018 ANSI/AWC National Design Specification (NDS) for Wood Construction. The lateral resistance of Kalesnikoff CLT, when used as shearwalls or diaphragms, depends on the panel-to-panel connection and anchorage designs, and shall be consulted with the CLT manufacturer and approved by the engineer of record.

   Design values for the Load and Resistance Factor Design (LRFD) used in the U.S. for Kalesnikoff CLT can be derived from the ASD values published in Table 2 of this report in accordance with Tables 10.3.1, N1, N2, and N3 of the 2018 NDS.

4. Product installation:
   Kalesnikoff CLT shall be installed in accordance with the recommendations provided by the manufacturer and the engineering drawing approved by the engineer of record. Permissible details shall be in accordance with the engineering drawing.
5. Fire-rated assemblies:
   Fire-rated assemblies shall be constructed in accordance with the recommendations provided by the manufacturer. Procedures specified in Chapter 16 of the 2018 NDS shall be permitted for use in designing Kalesnikoff CLT for a fire exposure up to 2 hours.

6. Limitations:
   a) Kalesnikoff CLT shall be designed in accordance with principles of mechanics using the allowable design properties specified in this report or provided by the manufacturer.
   b) Kalesnikoff CLT shall be limited to dry service conditions where the average equilibrium moisture content of solid-sawn lumber is less than 16 percent.
   c) Design properties for Kalesnikoff CLT, when used as beams or lintels with loads applied parallel to the face-bond gluelines, are beyond the scope of this report.
   d) Kalesnikoff CLT shall be manufactured in compliance with ANSI/APA PRG 320 and documented in the Kalesnikoff Mass Timber Inc’s in-plant manufacturing standard approved by APA.
   e) Kalesnikoff CLT is produced at the Kalesnikoff, Thrums, British Columbia facility under a quality assurance program audited by APA.
   f) This report is subject to re-examination in one year.

7. Identification:
   Kalesnikoff CLT described in this report is identified by a label bearing the manufacturer's name (Kalesnikoff) and/or trademark, the APA assigned plant number (1133), the product standard (ANSI/APA PRG 320), the APA logo, the CLT grade, the report number PR-L332, and a means of identifying the date of manufacture.
Table 1. ASD Reference Design Values\(^{(a)}\) for Lumber Laminations Used in Kalesnikoff CLT (for Use in the U.S.)

<table>
<thead>
<tr>
<th>CLT Grade</th>
<th>Laminations Used in Major Strength Direction</th>
<th>Laminations Used in Minor Strength Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade &amp; Species</td>
<td>(F_b) (psi)</td>
</tr>
<tr>
<td>E1, E1.1, E1.2, &amp; E1.3</td>
<td>1950f-1.7E SPF</td>
<td>1,950</td>
</tr>
</tbody>
</table>

For SI: 1 in. = 25.4 mm; 1 ft = 304.8 mm; 1 lbf = 4.448N

\(^{(a)}\) Tabulated values are allowable design values and not permitted to be increased for the lumber size adjustment factor in accordance with the NDS. The design values shall be used in conjunction with the section properties provided by the CLT manufacturer based on the actual layup used in manufacturing the CLT panel (see Table 2).

Table 2. ASD Reference Design Values\(^{(a,b)}\) for Kalesnikoff CLT Listed in Table 1 (for Use in the U.S.)

<table>
<thead>
<tr>
<th>CLT Grade(^{(a)})</th>
<th>Layup ID</th>
<th>Thickness, (t_v) (in.)</th>
<th>Lamination Thickness (in.) in CLT Layup</th>
<th>Major Strength Direction</th>
<th>Minor Strength Direction</th>
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<tbody>
<tr>
<td></td>
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<td>=</td>
<td>(\perp)</td>
<td>=</td>
<td>(\perp)</td>
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<tr>
<td>E1</td>
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</table>

For SI: 1 in. = 25.4 mm; 1 ft = 304.8 mm; 1 lbf = 4.448N

\(^{(a)}\) Tabulated values are allowable design values and not permitted to be increased for the lumber size adjustment factor in accordance with the NDS.

\(^{(b)}\) Deflection under a specified uniformly distributed load, \(w\), acting perpendicular to the face of a single-span CLT panel shall be permitted to be calculated as a sum of the deflections due to moment and shear effects using the effective bending stiffness, \((EI)_{eff}\), and the effective in-plane (planar) shear rigidity, \((GA)_{eff}\), as follows:

\[
\delta = \frac{22.5wL^4}{(EI)_{eff}} + \frac{3wl^2}{2(GA)_{eff}}
\]  

[1]
where: \( \delta \) = estimated deflection, inches; \( w \) = uniform load, plf;
\( L \) = span, feet; \( (EI)_{\text{eff}} \) = tabulated effective bending stiffness, \( 10^6 \) lbf-in.\(^2\)/ft; and
\( (GA)_{\text{eff}} \) = tabulated effective in-plane (planar) shear rigidity, \( 10^6 \) lbf/ft.

For a concentrated line load, \( P \), located in the middle of a single span CLT panel acting perpendicular to the panel, the deflection shall be permitted to be calculated as follows:

\[
\delta = \frac{36PL^3}{(EI)_{\text{eff}}} + \frac{3PL}{(GA)_{\text{eff}}}
\]  

[2]

where: \( P \) = concentrated line load, lbf; Other variables are defined in Eq. 1.

(c) The CLT grade and layups are developed based on ANSI/APA PRG 320, as permitted by the standard.
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